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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,500	12/21/2001	Mathieu Pinault	PET-1975	4487

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MILLEN, WHITE, ZELANO & BRANIGAN, P.C.
2200 CLARENDON BLVD.
SUITE 1400
ARLINGTON, VA 22201

EXAMINER
NGUYEN, TAM M

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 07/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/024,500	Applicant(s) PINAULT ET AL.	
	Examiner Tam M. Nguyen	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-16* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, 7, 8 and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cosyns et al. (6,072,091).

Cosyns discloses a process for treating a feedstock which comprises butadiene (diene) and acetylene in a minor proportion by feeding the feedstock into a distillation zone comprising a rectification zone and a drainage zone. Cosyns also discloses that at least one stage for hydrogenation of acetylene compounds in a hydrogenation zone, which comprises at least one catalytic bed, is located outside the distillation zone. The hydrogenation zone is operated in the presence of hydrogen. A portion of the feedstock which circulates in the distillation zone that contained acetylene compounds is drawn off in liquid phase at a level in a drainage zone. A hydrogenation effluent, which is low in acetylene compounds and enriched in oligomers, is recycled in a rectification zone of the column. A stream comprising essentially all of the butadiene is recovered at the top of the distillation zone and an oligomer-riched C_5 fraction is recovered at the bottom of the distillation zone. Since most of acetylene compound is saturated in the hydrogenation zone and the overhead stream comprises essentially all of C_{4-}, it would be expected that the overhead stream comprises a low amount of acetylene compound as claimed. (See col. 2, line 33 through col. 6, line 44; table 1)

Claim 1, 7 and 11:

Cosyns does not disclose that a stream is rich in acetylene or a stream has a highest the ratio of the acetylene compounds/butadienes concentrations at the level of the lateral draw-off from a drainage zone. However, Cosyns discloses that the hydrogenation is selectively hydrogenated acetylenic and/or diolefinic (butadiene) hydrocarbons (see claims 1 and 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by drawing-off a stream having the claimed ratio (highest in acetylene) because if one of skill in the art desires to saturate acetylenes

(not butadiene) from the feedstock, one would draw off a stream from the column at a location where the stream is rich in acetylene or the stream has the ratio of acetylene/butadiene is highest.

Claims 2 and 12:

Cosyns does not specifically disclose that the feedstock is a steam cracking effluent which comprises hydrocarbons having 4-5 carbon atoms or comprises majority of hydrocarbon having 4 carbon atoms. However, the Cosyns feedstock comprises the most part hydrocarbons with four to five carbon atoms per molecule and the Cosyns feedstock is from a cracking process and the process of Cosyns is an effective separation process (see col. 2, lines 60-64; table 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by using the claimed feed because the process of Cosyns is effective to hydrogenate acetylene and separate a hydrocarbon mixture comprising C_3-C_{10} carbon atoms into a C_{4-} fraction and a C_{5+} fraction and the amount of C_4 and C_5 in the mixture is not critical. Therefore, it would be expected that the claimed feedstock would be effective to process in the process of Cosyns.

Claims 3 and 13:

Cosyns does not disclose that the feedstock comprises at least equal to 20% or 50% by weight of butadiene. However, Cosyns discloses that the butadiene would be saturated in the hydrogenation zone if it is desirable (see claims 1 and 2). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by utilizing a feed comprising the claimed amount of butadiene because the amount of butadiene content in the feedstock is not critical because butadiene would be

hydrogenated in the hydrogenation zone. Therefore, one of skill in the art would use the claimed feedstock if one desires.

Claims 4 and 14:

Cosyns does not disclose that the feedstock comprises at most 20% or 2.5% by weight of acetylene compounds. However, Cosyns discloses the feedstock comprises small proportions of acetylenes (see col. 2, lines 61-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by utilizing a feedstock comprises at most 20% or 2.5% by weight of acetylenes because one of skill in the art would employ a feedstock comprising any small proportions of acetylenes including the claimed amount of acetylenes.

Claims 5 and 15:

Cosyns does not disclose that the draw-off flow rate is at most equal to twice the flow rate of the feedstock. However, Cosyns discloses that the distillate (output-streams)/feed ratio is a parameter (see col. 4, lines 50-54). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by utilizing the claimed flow rates because one of skill in the art would selectively utilize the flow rate of distillates and feed including the claimed flow rates to produce corresponded products, which comprise desirable components.

Claim 8:

The distillation column is operated at a pressure of from 4-15 bar, at a top temperature of from 20-100° C, and a bottom temperature of from 100-300° C. (See col. 5, line 63 through col. 6, line 3)

Cosyns does not disclose that the column has 35-42 theoretical plates of 35-42. However, the distillation column of Cosyns has 30 plates (see col. 6, lines 60-64) and it is known that in a distillation column, the higher the number of plates, the purer the products will be obtained. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by utilizing a column having the claimed number of plates because purer products will recover.

Claim 10:

Cosyns does not disclose that a step of adjusting the temperature of the hydrogenation effluent upstream from the recycling level in the rectification zone. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by adjusting the temperature of the hydrogenation effluent because it is effective to produce an overhead stream comprising desirable components by adjusting the temperature of the hydrogenation effluent to a temperature which is substantially the same as the temperature in the rectification zone.

Claims 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cosyns et al. (6,072,091) in view of Boitiaux et al. (4,490,481).

The hydrogenation is operated at a pressure of from 2-20 bars, at a temperature of from 50-150° C and at a volume flow rate of from 1 to 30 h^{-1}. The hydrogen flow rate corresponding to the stoichiometry of hydrogen reaction taking place is in the range 0.5 to 10 times the schoichiometry (0.25-5 molar ratio) and the hydrogenation catalyst comprises palladium. See col. 7, lines 6-8; col. 6, lines 27-45.

Cosyns does not specifically disclose that the catalyst comprises 0.01 to 1% by weight of Au. However, Boitiaux discloses a hydrogenation process wherein a catalyst comprising noble metal of group VIII (e.g., palladium) and .003 to .3 % of gold (Au) is used (see abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Cosyns by using the catalyst of Boitiaux because the Boitiaux catalyst has equivalent function as the Cosyns catalyst.

Allowable Subject Matter

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The primary reason for allowance is that the prior of record does not disclose or suggest the use of a distillation column wherein the lateral draw-off level is located below the center of the column at a height that corresponds to fewer than five theoretical plates from the center and the hydrogenation effluent is recycled above the center of the column at a level that corresponds to a height within the first five theoretical plates from the top of the column.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam M. Nguyen
Examiner
Art Unit 1764

TN
June 30, 2003